



# Study on Hepatitis B Birth Dose Vaccination Coverage, Promoting the Same in a Private Rural Medical College, Karnataka, South India

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## INTRODUCTION

Viral hepatitis B (HBV) is a silent public health problem of extraordinary scale. Globally, over two billion are infected with HBV, 360 million chronic carriers with an estimated 8Lakh annual death by liver cancer/cirrhosis.<sup>1</sup> 78% of liver cancer and 57% of cirrhosis are attributable to HBV. Prevalence rates of HBV vary from 5 to 20% in the developing world.<sup>2</sup> Perinatal transmission accounts >15% of HBV related deaths even in low endemic areas.<sup>3</sup> Though HBV related morbidity and mortality are close to that of HIV/AIDS; more than malaria and tuberculosis, it is the most underestimated and ignored disease. It could not even get featured in the Millennium Development Goals of 2000.<sup>4</sup>

India has intermediate endemicity with 2 to 8% prevalence, pooling 40-50 million chronic HBV carriers. Per single year birth cohort of surviving

## ABSTRACT

**Introduction:** Administration of Hepatitis B vaccine at birth within 24 hrs prevents ~95% of perinatally acquired Hepatitis B Virus infections, averting 15% of total burden. **Objectives** of this study were to find out the baseline coverage of newborn vaccination especially HepB birth dose and to raise the HepB birth dose coverage in a Private Rural Medical College.

**Methodology:** Newborn vaccination data of all live births between 01<sup>st</sup> April 2013 and 31<sup>st</sup> March 2014 was collected in the 'Extended Immunogram tool'. Simple, doable promotive measures were operated between the last week of April and 31<sup>st</sup> August 2014.

**Results:** HepB birth dose vaccination coverage was 56.1%. More infants were born (71.28%) in Private facilities with low coverage (43.35%) than in Govt facilities (28.71%) but with high coverage (87.76%) -  $p < 0.001$ . HepB birth dose coverage within 24 hrs was 26.5% in the Medical College which rose significantly from 19% in April 2014 to 100% in July/August 2014 through intervention.

**Conclusion and recommendation:** HepB birth dose coverage can be raised and sustained through simple doable measures. Display of newborn vaccination protocol as job-aid for uniform service delivery is recommended.

**Key words:** Immunization, Newborn vaccination, HepB birth dose, Supportive Supervision

children, over 9 million are estimated to acquire HBV infection during their life time, an estimated >15Lakh develop chronic HBV infection and nearly 2Lakh would die of acute or chronic consequences of HBV infection.<sup>5</sup>

Inaccessibility to appropriate long term treatment, scarcity of treatment experts and significant cost constitute another challenge.<sup>6</sup> But, Hepatitis B (HepB) vaccine is universally available. Through adequate and timely vaccination HBV can be even eliminated. It also checks Hepatitis D Virus and is considered as the first anticancer vaccine.<sup>5,7</sup>

Though there are studies evaluating efficacy and cost-effectiveness of HepB birth dose, we could not find studies on differential coverage of newborn vaccination between public and private sector and impact of intervention to raise the coverage.

## METHODOLOGY

We conducted a cross sectional, observational study in a cohort of infants born between 01<sup>st</sup> April 2013 and 31<sup>st</sup> March 2014 followed by promotional measures in a Private Rural Medical College for raising the coverage. Newborn vaccination data was collected from four selected Government (Govt) Planning Units, comprising 37 ANMs covering 1,19,837 population with 1510 live births in the above period of which 1508 were institutional, included for analysis. Two home deliveries were not included in the analysis.

Intensified Routine Immunization (IRI) recommends supervisory support for 4 consecutive months<sup>8</sup>. Simple doable promotive measures for 4 months were undertaken to raise birth-dose coverage between the last week of April to the last week of August 2014 which included advocacy with Departments of Obstetrics & Gynecology, Pediatrics, Hospital Administrators, orientation of caregivers, display of Newborn vaccination protocol / job-aid / posters of National Immunization Schedule (NIS) and vaccine preventable diseases in the vaccination room, visit to demo-site, regular monitoring, supportive supervision and adequate timely feedback.

Vaccination data were collected using *Extended Immunogram tool* developed by the first author. Immunogram is an offline, user friendly tool for the line listing of vaccination data of all the children living in the catchment area of a vaccination session site. It can easily measure Left-out and Drop-out (LODO); identify backlogs and auto-

display the due children, helping rapid backlog clearance and to vaccinate close to the schedule, addressing the global concern of closing population immunity gap in a shortest period.<sup>9</sup> It is *extended* by inserting two additional columns: one, to collect the names of birthing facilities to felicitate good performing facilities, to advocate poor performing facilities for raising the coverage through regulatory authority and the second to record the gender to study on gender discrimination if any. Data analysed using Microsoft excel.

## RESULTS

Overall coverage of HepB birth dose was 56.1%. More children were born in Private facilities - 71.28% in 96 institutions than in Govt facilities - 28.71% in 41 institutions. HepB birth dose coverage was low in Private facilities - 43.35% than in Govt facilities - 87.76%. Other newborn vaccinations viz. Zero OPV within 15 days of birth and BCG within 30 days of birth were high i.e. >90% both in Private and Govt sectors of four planning units. In the Private Rural Medical College, annual HepB birth dose coverage within 24 hrs was 26.5%, within 48 hrs was 53%. Coverage of Zero OPV and BCG were 88.25%. (Table 1)

Qualifying HepB birth dose coverage was 56.1% in the catchment area of four planning units where as it was 26.5% in the rural Medical College. Missed opportunity was 11.7% in the College and 30.57% in the planning unit area. (Table 2)

**Table 1: Newborn vaccination among live births**

Four Planning Units' area	Live births	HepB within 24 hrs	Zero OPV within 15 days	BCG within 30 days
41 Government Facilities	433 (28.71)	380 (87.76)*	430 (99.3)	430 (99.3)
96 Private Facilities	1075 (71.28)	466 (43.35)	985 (91.62)	1026 (95.44)
Total 137	1508	846 (56.1)*	1415 (93.83)	1456 (96.55)
Rural Medical College	562	149 (26.5)	496 (88.25)	496 (88.25)

\*p<0.001; Figures in parenthesis indicate percentage

**Table 2: HepB birth dose Timeliness between 4 planning units and the Medical College**

Place	Live births	<24 hrs	24 to 48rs	3-7 days	>7 days	Missed opportunity
Total of 4 Planning units	1508	846 (56.1)	92 (6.1)	87 (5.76)	22 (1.46)	461 (30.57)
Rural Medical College	562	149 (26.5)	149 (26.5)	188 (33.5)	10 (1.8)	66 (11.7)
P value		<0.001	<0.001	<0.001	>0.05	<0.001

Figures in parenthesis indicate percentage

**Table 3: Impact of intervention and supportive supervision in Medical College**

Month	Live births	Zero OPV (%)	BCG (%)	Hep-B <24 hrs (%)	Hep-B 24to48 hrs (%)	Hep-B 3to7 days (%)	Hep-B >7days (%)	Unvaccinated n (%)
April	47	44 (93.6)	44 (93.6)	9 (19.1)	14 (29.78)	19 (40.40)	2 (4.2)	3 (6.4)
May	30	29 (96.6)	29 (96.6)	26 (86.66)	1 (3.3)	2 (6.66)	0	1 (3.33)
June	37	37 (100)	37 (100)	34 (91.89)	2 (5.4)	1 (2.7)	0	0
July	35	35 (100)	35 (100)	35 (100)	0	0	0	0
Aug	39	39 (100)	35 (100)	39 (100)	0	0	0	0

Figures in parenthesis indicate percentage

**Table 4: Gender-wise coverage (Sex ratio- 966) (%)**

Sex	N=1508	Zero OPV	BCG	HepB <24 hrs	24 to 48 hrs	3 to 7 days	>7 days	Missed opportunity
M	767	719(93.74)	735(95.83)	452(58.93)	50(6.52)	37(4.82)	10(1.30)	218(28.42)
F	741	696(93.93)	721(97.30)	395(53.31)	42(5.67)	50(6.75)	12(1.62)	242(32.66)

Qualifying birth dose coverage rose significantly from 19% in April to 100% in July and August 2014. Delay and unvaccinated drastically dropped to zero. (Table 3)

Of the 1508, males were 767 and females were 741; giving sex ratio of 966 female per 1000 male. No conspicuous gender discrimination in our study, marginally a few more females received zero OPV and BCG but few less for HepB birth dose.(Table 4)

## DISCUSSION

Realizing the public health importance and to overcome the lapses, the World Hepatitis Day was launched on 28<sup>th</sup> July since 2010.<sup>10</sup> On WHO recommendations, HepB vaccine for infants was introduced nationwide in 185(95%) countries and a birth dose for HepB vaccine was introduced in 97(49%) countries by the end of 2015. WHO estimated that 84% of all infants worldwide received at least 3 doses of hepatitis B containing vaccine in 2015 and 39% of newborns received the birth dose.<sup>11</sup> In India, HepB3 coverage consistently and visibly increased in the last five years: 44%; 73%; 70%; 79% and 87% in 2011/12/13/14 and 2015 respectively, but the increase in birth dose coverage was low during the same period viz. 8%/ 23%/ 37%/ 41% and 44%.<sup>12</sup> Our study revealed a baseline coverage of 51.6% in 2013-14 which is higher than that of national coverage in 2015 (Table 1).

Perinatally one third of the infants acquire HBV from carrier mother, remaining two thirds from household carriers (horizontal transmission) via service providers / medical errors and visitors.<sup>13</sup> Vaccination reduced the rate of chronic infection from 8 - 15% to less than 1% and can potentially avert 4.8million HBV related deaths over a 10 year period.<sup>14</sup> In the study cohort, 30.57% and 11.7% of newborns permanently missed the opportunity for HepB birth dose in the four planning unit area and the Medical College respectively. Another 7.22% and 35.3% received birth dose after 48 hrs but before discharge in the planning units and Medical College respectively (Table 2).

WHO / NIS and IAP recommend birth dose as early as possible within 24 hrs.<sup>15,16</sup> Health Management Information System (HMIS) of Govt of India accepts birth dose within 48 hrs as qualified and the manufacturers recommend 'within discharge', as a result, adhering strictly to the NIS, in Govt set up in a few cases of unavoidable delay, birth dose

was denied after 24 hrs and Private sector is not so strict, often administered after 48 hrs just before discharge, affecting the efficiency of prevention.

During the study, another high risk practice was observed. 301(20%) infants born in Private facilities made excursion to nearby Govt facility for newborn vaccination with good intention but risking hypothermia and infection though the risk is not quantified as it is beyond the scope of present study. This is not in compliance with the newborn vaccination protocol which recommends vaccination during the observation period in the labour room or newborn corner before shifting to the postnatal ward.<sup>17</sup>

How to raise HepB birth dose is a global challenge.<sup>18</sup> WHO document - "Practices to improve coverage of the *hepatitis B* birth dose" narrates detailed measures.<sup>19</sup> In this study, it is observed that some pioneer institutions are administering zero OPV but not HepB birth dose and BCG. Thiomersal myth still exists strongly among the learned.<sup>20</sup> Decision to deny the birth dose and delaying subsequent doses of HepB vaccine widens population immunity gap and had already placed those infants who potentially have been infected with HBV in the queue to succumb to the complications in the most productive age group. Any delay in implementation makes this queue longer day by day.<sup>21</sup>

Responding to the Global concern of raising HepB birth dose vaccine, intervention was launched in the 3<sup>rd</sup> week of April 2014. In the study Medical College, the coverage increased from 19% in April to 100% by July/August 2014 and as a spinoff, coverage of zero OPV and BCG also rose from 94% in April to 100%. It is sustained as it has become the part of newborn care protocol like cord care/eye care/vitamin K administration/early breast feeding. (Table 3) As suggested by Dr Khaji, Deputy Director Immunization, Dept of Health and Family Welfare services, Govt of Karnataka, we started putting a stamp against each newborn in the delivery register in which dates of Newborn vaccination is entered. Adequate vaccination of infants, starting with birth dose followed by timely 2 to 3 regular doses can even eliminate HBV.<sup>22</sup> In India, birth dose is followed by 3 doses at 6,10 and 14 weeks as per NIS.

Moreover, high female literacy, small family norm, more women empowerment etc almost eliminated

gender discrimination in our study area supporting MDG 2000 goals/strategies (Table 4).

### The SWOT (Strengths/ Weaknesses/ Opportunities/ Training)

**Strengths:** 99.99% Institutional deliveries. High coverage in Govt sector. Home delivered were administered birth dose by ANMs.

**Opportunities:** To administer HepB birth dose even if 24 hr is crossed in rare occasions. Timely and universal administration of HepB birth dose in private sector. Displaying Newborn vaccination protocol as job-aid.

**Weaknesses:** Poor coverage in private sector, especially HepB birth dose in Private Medical Colleges.

**Training:** Orientation of service providers in Medical Colleges for practicing NIS - the essential vaccination services, utilizing them as resource persons to advocate private birthing institutions.

### CONCLUSION AND RECOMMENDATION

HepB birth dose coverage can be raised and sustained through simple doable measures in birthing institutions. Uniform service delivery by well trained dedicated staff, display of newborn vaccination protocol as a job-aid and regular weekly / monthly performance review in all birthing facilities are recommended. Timely administration of newborn vaccines - a best gift to the newborns, motivates the parents to achieve full / complete immunization--a public health intervention of immense importance.

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